Tim Frijnts et al., J Laser Opt Photonics 2016, 3:2 (Suppl)
http://dx.doi.org/10.4172/2469-410X.C1.005

Laser processing of solar cells on laser crystalized silicon

Tim Frijnts, Sven Kühnapfel, Holger Rhein, Stefan Gall, Christof Schultz, Bernd Rech and **Rutger Schlatmann**
Helmholtz Zentrum für Materialien und Energie Berlin, Germany

Low quality silicon was deposited on silicon oxynitride layers on glass. This was then crystallized over a liquid phase using a line-shaped, 808 nm, continuous wave, diode laser, in order to obtain crystalline silicon with grain size comparable to multicrystalline silicon wafers. A 1064 nm picosecond laser, applied through the glass, was used to make isolation scribes which define the cell area and also allow for the fabrication of a mini-module consisting of series connected cells. A 355 nm picosecond laser, in combination with a white resin layer, was used to structure the contacting layers of the backside contacted solar cell, thereby avoiding the use of expensive and cumbersome lithography processes. Finally, a 532 nm nanosecond laser was used to modify the metal-silicon contact in order to reduce the contact resistance, resulting in a new highest efficiency for this cell type of 12%.

Biography

Tim Frijnts has finished his MSc in Applied Physics at Delft University of Technology in 2010, after which he went to work as Device Expert at the thin film silicon solar cell company Masdar PV GmbH in Germany. At the end of 2013, he started his PhD at HZB/PVcmB (part-time), as part of an ambitious plan of Masdar PV and HZB to commercialize liquid phase crystallized silicon. When one year later Masdar PV decided to shut down, he had the opportunity to continue at HZB to finish his PhD.

Tim.Frijnts@Helmholtz-Berlin.de

Notes: